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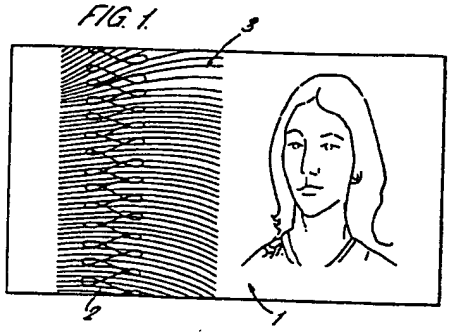
(54) Sheet element having a reflective anti-counterfeiting device and manufacture thereof.

(57) The present invention provides a method for the manufacture of a sheet element 1 having a reflective anti-counterfeiting device 2 and in particular provides a method for the manufacture of a security document. The method comprises the steps of applying a continuous band of a foil material in the form of a repetitive pattern to a portion of the surface of the sheet element and overprinting at least a part of the foil material with a security tint 3.

The present invention envisages the use of hot foil stamping or a similar method such as a transfer process to apply a metallic foil or similarly reflective film on to a surface of the material to be used for printing a security document.

The present invention provides security documents having improved protection against counterfeiting and is particularly applicable to the manufacture of bank notes.

FIG. 1.



EP 0 093 009 A2

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"SHEET ELEMENT HAVING A REFLECTIVE ANTI-COUNTERFEITING DEVICE AND MANUFACTURE THEREOF"

The present invention relates to a sheet element having a reflective anti-counterfeiting device and manufacture thereof, and in particular to security and other valuable documents having a security band in the form of a continuous protective pattern.

There is both a present and an increasing danger of security documents of all kinds being counterfeited by various graphic arts techniques including not only traditional printing methods but also, increasingly, photographic and electronic scanner half-tone colour separations and colour copiers. It is to be expected that these techniques will be improved in quality and speed and that consequently the future danger of security documents being counterfeited is likely to arise mainly from the automatic imaging and manufacture of plates or copies.

One aspect which all of these processes have in common is that they require illumination, which is incident on the surface of the security documents, to be diffusely reflected from the surface onto an imaging system. The reproduction of the prints on the original document is in the end carried out using coloured inks or toners. These processes could all, therefore, be prevented from producing effective counterfeits if a feature was incorporated on the documents whose reflection characteristic had a large specular component.

It has therefore been proposed to use metallic inks or coatings on the surface of documents. However, metallic inks are not effective in practice because they are made from metallic platelets or particles which cannot be strictly orientated with respect to a plane surface so as to produce a specular reflection over a large area. A contributing factor to this is the unevenness of most paper surfaces. A copy of a metallic ink printed original might therefore resemble the original too closely to be detected as a counterfeit.

Alternatively, methods are known whereby a thin metallic sheet having a mirror-like surface can be applied to the surfaces of paper and similar materials.

When documents having this type of surface are copied, the reproduction usually appears as either a dull matt colour or combination of colours, or as a non-printed area, depending on the method of illumination and imaging and the angles of incidence and reflection of the light from the light source. This provides a significant difference between the original and its copy.

It has also been proposed to use adaptations of conventional labelling or hot foil stamping techniques, whereby shaped areas of metallised plastic film are adhesively applied to a security document at some point during the production process thereof to give areas exhibiting the desired effect during reproduction. However, this method has a disadvantage in that it requires an extra application process to be carried out in registration with the printed design. This method may also increase the thickness of a pile of such documents over that part of their area which is covered by the metallised plastic film, thus giving rise to difficulties in subsequent printing and handling processes.

The present invention provides a method for the manufacture of a sheet element having a reflective

anti-counterfeiting device, the method comprising the steps of (a) applying a continuous band of a foil material in the form of a repetitive pattern to a portion of the surface of the sheet element; and (b) printing the sheet element, preferably so as to overprint at least a part of the foil material.

According to one aspect of the present invention there is provided a sheet element having a reflective anti-counterfeiting device. The combination of the sheet element and the reflective anti-counterfeiting device may constitute a security document. The reflective anti-counterfeiting device is specularly reflective at least in some areas and is at least partly overprinted with a security tint. The arrangement can ensure good security against counterfeiting by photoreproduction.

According to another aspect of the invention, the reflective anti-counterfeiting device is a foil material which is in the form of a continuous band in the form of a repetitive pattern. The foil material may be metallised or metallic. When the foil material is metallic, the surface thereof may be additionally coated or printed with a security tint of a particular pattern and colouration, thereby giving further difficulty to a potential counterfeiter.

sheet element by a process of hot foil stamping or by a transfer process. The application is carried out with an elongate length of the foil material to constitute a plurality of the sheet elements thereby to result in a relatively convenient and inexpensive manufacturing process. In addition, the foil material is very thin when compared to the thickness of the sheet element and so the thickness of the sheet element is not substantially increased over that part of its surface on which the foil material is disposed.

A specific example of the present invention will now be described in greater detail with reference to the accompanying drawings, in which; -

Figure 1 shows a diagram of a security document; and

Figure 2 shows schematically apparatus for applying foil material to a web of a sheet element.

Figure 1 shows a security document, such as a bank note 1, which has been manufactured in accordance with the present invention. The bank note 1 consists

The bank note 1 has a continuous band 2 of a thin-layered foil material disposed on its surface across its width at a specific position along its length. The foil material is a metallic foil or a similarly reflective film. The foil material is in the form of a continuous, repetitive pattern, which is preferably complicated and characteristic of the particular bank note 1 to which the foil material is applied.

The width of the band 2 is preferably between 0.5 centimetres and 2.5 centimetres.

The continuous band 2 is overprinted with at least one security tint 3. The security tint 3 is of a pattern and colouration which is a characteristic part of the particular bank note 1. The security tint 3 extends over both the surface of the continuous band 2 and the surface of the bank note 1 adjacent thereto.

The bank note 1 is printed over other portions of its surface with the normal printings which make up the remainder of the design of the bank note 1.

The methods of manufacture of the sheet element carrying the reflective anti-counterfeiting device which is later printed to become the bank note 1 are described hereinbelow with reference to Figure 2.

When the bank note 1 or other security document is to be made of paper, a known method of manufacture of paper bank notes involves the production of a reel or web of paper which may either be printed in web-form or cut into a number of sheets which are printed with a number of prints individually. Each web or sheet is then cut up into a number of individual bank notes 1 or other security documents.

According to the present invention and as is shown in Figure 2, a continuous band 4 of the foil material is applied to a reel of paper 5 before the reel is sheeted or printed. The reel 5 is unwound in the direction shown by the arrow A and the web of paper 6 is fed continuously through means 7 for applying the foil material. Figure 2 only shows the arrangement of the apparatus for the application of one band 4 of foil material, although it will be apparent to those skilled in the art that a number of means 7 may be employed to apply a corresponding number of bands 4. The web of paper 6 is then stored on a second reel 8 ready for subsequent printing or sheeting prior to printing.

The foil material may be applied by the method of hot foil stamping or by a similar method such as a transfer process.

A plurality of stamping stations each having a respective means 7 for applying bands 4, are arranged along a line transverse to the direction of feed A of the web of paper 6. The foil material is applied to the web of paper 6 along the length of the web at specific positions along the width of the web, such that after sheeting and printing of the paper a band 2 of foil material is disposed on the surface of each bank note 1 at a particular position, as is shown in Figure 1.

At each stamping station, the web of paper 6 passes between two rollers 20,22. One of the rollers 20 is a die or wheel having a patterned outer cylindrical surface 24. In use, a length of suitable foil 9 which is disposed on a suitable backing material 10 is fed between the web of paper 6 and the patterned die or wheel 20.

When hot foil stamping is employed, the die or wheel 20 is maintained at an elevated temperature and the pressure applied by the die or wheel 20 to the foil 9, which is reflective, is such that the foil 9 is detached from the backing material 10 and is applied to the web of paper 6 in a pattern corresponding to that on the die or wheel 20.

When a transfer process is employed, the arrangement is similar to that used for hot foil stamping but the foil material is applied to the web of paper 6 only by the pressure of the die or wheel 20 and not by the action of both heat and pressure. In addition the transfer process may be used when the foil material to be applied to the web of paper is other than metallised.

When a metallised foil is employed in accordance with one embodiment of the invention prior to application of the web of paper 6, the metallised foil material may be at least partly coated with a lacquer. The lacquer can be applied either in a single or multicoloured pattern such that simulation of the metallised foil material, by employing commercially available materials, is rendered very difficult. The particular pattern and colouration of the lacquer may be arranged to be characteristic of the particular bank note 1 or other security document to which the foil material is to be applied.

According to yet another embodiment of the invention, the foil material may be another specularly reflective material.

The foil material may be applied to not only one but both sides of the web of paper 6. In this case

two patterned dies or wheels 20 may be employed, each being associated with a respective length of the foil 9 to be applied to the web of paper 6.

After the foil material has been applied to the web of paper 6 the paper is then passed, either in that form or via a sheeter in which the paper is cut into sheets of appropriate dimensions, to a security document printer. The paper is then printed with a security tint 3 in a known manner and with other desired prints, which is very convenient in operation. There is a considerable security value in the foil material being subsequently overprinted by the security tints normally employed in the manufacture of security documents, for example bank notes.

Although the present invention has been described with particular reference to the application of foil material to the surface of paper for manufacture of security documents, such as bank notes, it will be apparent that the method of the present invention may be employed to apply a continuous patterned foil to any other suitable substrate, the band being subsequently overprinted to impart a characteristic visual appearance to the combination. The present invention is not limited to the manufacture of security documents, but may be employed in other

fields, such as, for example, the production of printed material wherein identification of the source of the material is desirable. In another example, the process may be employed in the manufacture of genuine product labels to increase the difficulty of producing counterfeit labels to be attached to counterfeit goods. Printing is to be construed herein in its broadest sense to include any other forms of reproduction.

Further, the substrate to which the foil material is to be applied may be composed of, for example, plastics material. In this case, the invention has particular applicability to the production of credit cards, or the like.

Referring again to Figure 2, in the production of credit cards, a web of plastics material 6 is passed through means 7 for applying a patterned foil band 4. The band 4 is preferably applied by hot foil stamping. After the band 4 has been applied, the band 4 and that surface of the plastics material which is adjacent the band 4 is subsequently overprinted with, for example, a security tint and then the printed surface may be covered by a protective transparent plastics layer.

Preferred embodiments of the present invention

provide security documents which are convenient and relatively inexpensive to manufacture and provide good security against counterfeiting.

The application of the foil material may readily be incorporated into the known methods of manufacture of paper for security documents. The application process is very quick and is of a continuous nature. The process also readily ensures that the foil material is applied to the correct portion of the web of substrate. A suitable choice of pattern avoids the necessity to align the foil material in machine direction registration with the documents to be printed on the substrate.

The application of the foil material to the web of substrate by stamping, such as hot foil stamping, provides a secure bond between the substrate and the foil material. This is particularly essential in the production of bank notes where the bank notes are likely to be roughly handled in use.

The use of a foil, having a minimal thickness, provides that when a number of security documents, such as bank notes, are arranged together in a pile, the thickness of the pile in that part of its area which corresponds to the foil material is not substantially increased and the pile has a uniform

thickness. This feature is very important for documents intended for use in automatic printing, handling and distribution apparatuses.

The provision of a reflective foil which is overprinted on at least part of its surface with a security tint ensures good protection against counterfeiting by, for example, photoreproduction. The combination of a characteristic pattern and colouration on the foil, which are applied to the foil prior to its incorporation onto the sheet element, with the security tint printed onto the foil and the surrounding surface of the sheet element, ensures even better protection against counterfeiting.

CLAIMS:

1. A method for the manufacture of a sheet element having a reflective anti-counterfeiting the method comprising the steps of:-

(a) applying a continuous band of a foil material in the form of a repetitive pattern to a portion of the surface of the sheet element; and

(b) printing the sheet element so as to overprint at least a part of the foil material.

2. A method according to Claim 1 wherein the band is in the form of a continuous repetitive pattern.

3. A method according to Claim 1 or Claim 2 wherein the foil material is composed of a reflective metallic material.

4. A method according to Claim 1 or Claim 2 wherein the foil material is composed of a specularly reflective material.

5. A method according to Claim 3 or Claim 4 wherein at least a part of the surface of the foil material is coloured prior to printing the sheet element.

6. A method according to claim 5 wherein prior to printing the sheet element the colour on the surface of the foil material is in a particular pattern.

7. A method according to claim 5 or claim 6 wherein at least a part of the surface of the foil material is multicoloured prior to printing the sheet element.

8. A method according to any preceding claim wherein the continuous band of foil material is applied to each side of the sheet element.

9. A method according to any preceding claim wherein the continuous band is applied to the sheet element by feeding an elongate length of the foil

material and an elongate length of the sheet element through a pair of rollers such that the foil material is applied to the sheet element.

10. A method according to Claim 9 wherein one of the rollers is heated and has a patterned cylindrical surface and the foil material is applied to the sheet element in a pattern corresponding to that on the roller.

11. A method according to any preceding claim further comprising the step of dividing the printed sheet element into a plurality of individual sheet elements, each having a respective length of foil material thereon.

12. A method according to any preceding claim wherein each sheet element is composed of paper.

13. A method according to any preceding claim wherein each sheet element is composed of plastics material.

14. A security document when made by the method of any preceding claim.

15. A bank note when made by the method of claim 12.

16. A credit card when made by the method of claim 13.

17. A product label when made by the method of claim 13.

18. Paper for the manufacture of security documents having a continuous patterned foil material extending across a surface of the paper.

19. Paper according to claim 18 wherein the continuous patterned foil is in the form of a repetitive pattern.

FIG. 1.

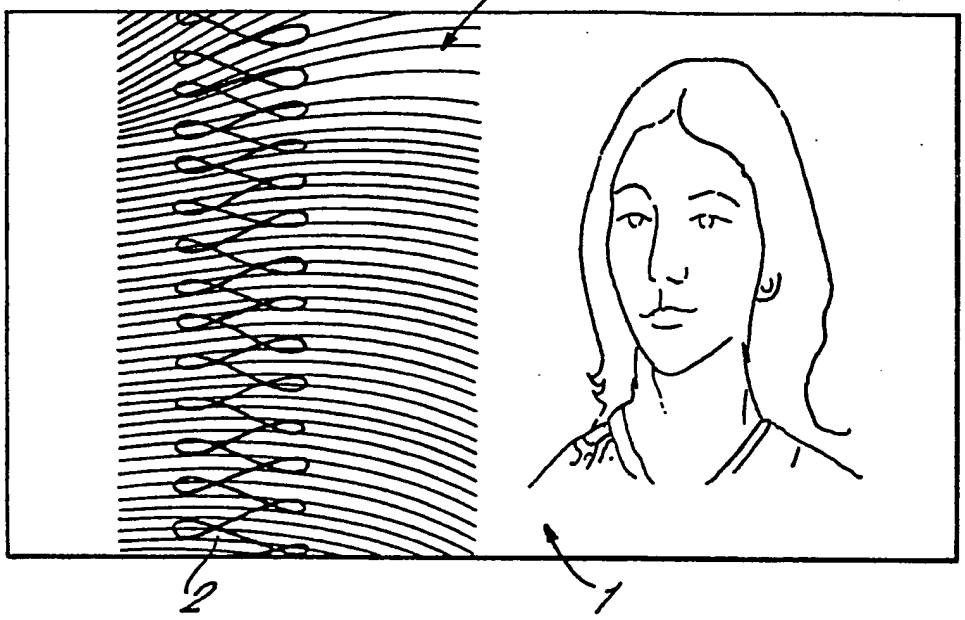
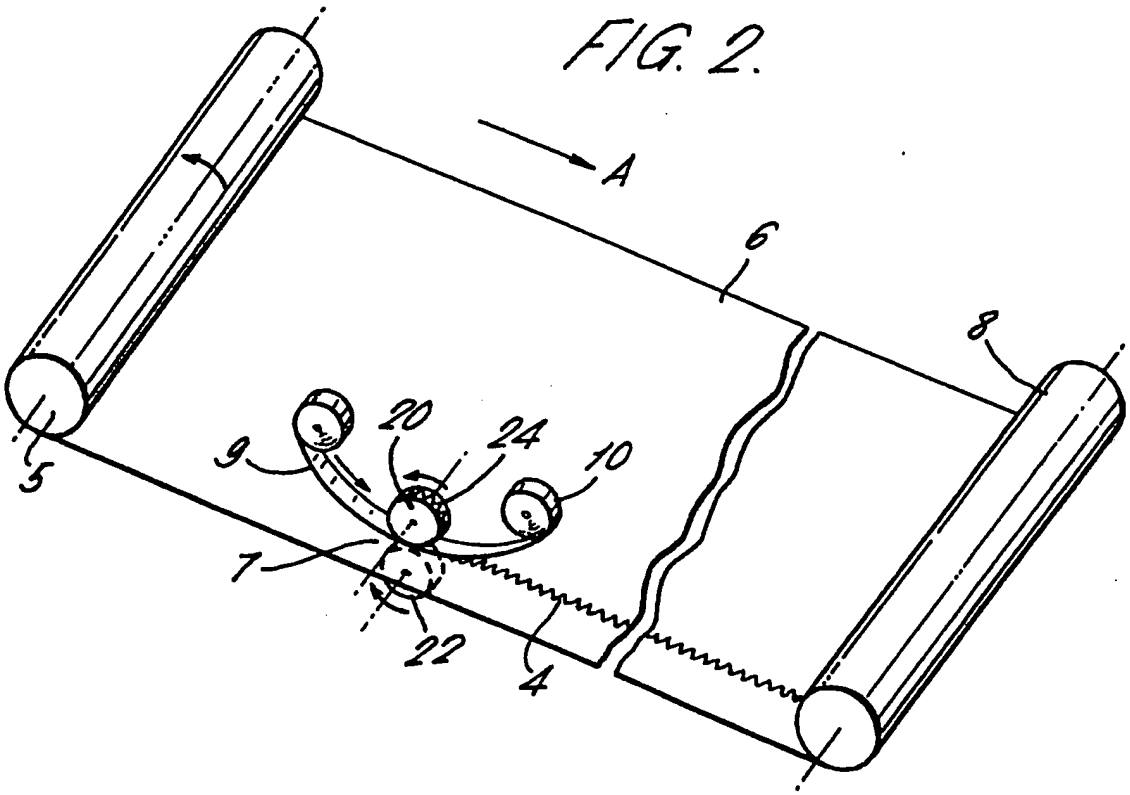


FIG. 2.



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